Why Do Some Children Have Difficulty Learning Mathematics? Looking at Language for Answers

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ABSTRACT: How children learn the world of mathematics with a disavantage. The authors explore the causes for this phenomenon and present educational solutions that can be implemented with students with special learning disabilities or specific language impairments. They also explore the role of language-imbued instruction in looking as a precursor to the mathematics environment. They offer solutions to how this can be implemented in the classroom, and suggest practical methods to help prepare young learners for their mathematics education.

KEYWORDS: early literacy; language-mediated instruction; learning disabilities; mathematics; specific language impairments

CHILDREN WITH LEARNING DISABILITIES (LD) or specific language impairments (SLI) often have difficulty learning the skills and performing the tasks associated with mathematics, especially beyond the fourth grade (Coohey, Pomer, Yen, & Miller, 1998; Brady, 2000; Eldred, Evans, & McGaw, 2003). For these learners, language difficulties, which is often characterized of LD and SLI (Ball & Canzonier, 2002), is an underlying contributor to learning mathematics. Ochsendorf (2007) provided a thorough summary of the limitations, linking difficulties with mathematics to language processing. Her summary included the following points: Approximately 70% of children between the ages of 3 and 6 years exhibit SLI, many children with SLI also have difficulty with mathematics; language abilities are key to play a role in number naming and sequencing (i.e., one counting) and number processing; phonological memory (i.e., storage and representation of speech sounds) and grammar (i.e., use of semantic structure and word order) to acquire meaning to numbers. Studies have shown that children with LD and SLI are more likely to have difficulty with mathematics due to language difficulties, especially in the early grades. In this study, the authors explore hidden ambiguities embedded in the western numbering system that can account for learner-confusion. Also explored is the casual language that accompanies early instruction of numeracy. This is seen as an additional source of ambiguity, increasing the confusion a student experiences with both numeration and quantitative concepts. Suggestions are offered.

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Number-sense is the ability to make accurate comparisons between quantities expressed as numbers. It is the foundation for learning all mathematics. Students who struggle with formal mathematics in later years often have significant deficits with number-sense. Operating from the assumption that some learners have been inadequately taught number-sense, the authors explore hidden ambiguities embedded in the western numbering system that can account for learner-confusion. Also explored is the casual language that accompanies early instruction of numeracy. This is seen as an additional source of ambiguity, increasing the confusion a student experiences with both numeration and quantitative concepts. Suggestions are offered.